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(54) Title: METHOD OF PREPARING A POORLY CRYSTALLINE CALCIUM PHOSPHATE AND METHODS OF ITS USE

(57) Abstract

The present invention provides a novel process for producing a calcium phosphate cement or filler which hardens in a temperature dependent fashion in association with an endothermic reaction. In the reaction a limited amount of water is mixed with dry calcium phosphate precursors to produce a hydrated precursor paste. Hardening of the paste occurs rapidly at body temperature and is accompanied by the conversion of one or more of the reactants to poorly crystalline apatitic calcium phosphate. The hardened cements, fillers, growth matrices, orthopedic and delivery devices of the invention are rapidly resorbable and stimulate hard tissue growth and healing. A composite material is provided including a strongly bioresorbable, poorly crystalline apatitic calcium phosphate composite and a supplementary material.

The supplementary material is in intimate contact with the hydroxyapatite material in an amount effective to impart a selected characteristic to the composite. The supplemental material may be biocompatible, bioresorbable or non-resorbable. A method for treating a bone defect also is provided by identifying a bone site suitable for receiving an implant, and introducing a strongly resorbable, poorly crystalline apatitic calcium phosphate at the implant site, whereby bone is formed at the implant site. The implant site may be a variety of sites, such as a tooth socket, non-union bone, bone prosthesis, an osteoporotic bone, an intervertebral space, an alveolar ridge or a bone fracture.

